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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/748,979  
Filing Date: December 30, 2003  
Appellant(s): MISHIMA ET AL.

Jason T. Evans (57,862)  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 11/2008 appealing from the Office action mailed December 20, 2007.

The information disclosure statements filed April 29/2008 and April 16, 2008 have been considered and are made of record with this mailing

Human English translations of JP 54-133134 and JP 2003-054135 (machine translation previously provided) have been ordered and will be mailed under a separate cover when they become available to the examiner.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The amendment after final filed April 16, 2008 was not entered.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

The rejections of the claims under 35 USC 112 on the basis of either being indefinite or lacking a written description are withdrawn.

The grounds for rejection identified in the Appeal Brief do not include:

Claims 17-27,29 and 31 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1,5,9,13 and 17-18 of copending Application No. 10/956010 (2005/0118530), in view of Takaoka et al. '321.

It would have been obvious to one skilled in the art to modify the invention of application 10/956010 by using plural recording layers as taught by Takaoka et al. '321 to increase recording capacity.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. (This application is still pending)

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,033,752	Suzuki et al.	03/2000
4,405,706	Takahashi et al.	09/1983
54-133134	Osada et al.	10/1979
4,682,321	Takaoka et al.	07/1987
2003-054135	Mizushima et al.	02/2003
2004-0018334	Nee	01/2004
5,871,881	Nishida et al.	02/1999
2001-0021160	Shuy et al.	09/2001

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

**C** Claims 17-25 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '752 and Takahashi et al. '706, in view of JP 54-133134.

Suzuki et al. '752 teaches in working example 21, a recording layer having a 20 nm Bi/ZnS/ SiO<sub>2</sub> layer in contact with a 14 nm In layer. (table 2/col 15). Working example 27 includes a 20 nm In/ZnS/ SiO<sub>2</sub> layer in contact with a 30 nm Te layer. The embodiment of figure 4 has two recording media comprising the recording bilayers (3/4) provided on a substrate and coated with a protective layer (5) and adhered together via an adhesive layer 8. The protective layer can be the materials listed at 10/62+ and may have a thickness of 5-200 nm. (10/63-11/10). There may be an interlayer of the materials disclosed in column 10 and may have a thickness of

10-20 nm (10/23-52). There may be a bedding layer to protect the substrate (9/59-10/22). The second recording layer (4) may be As, Se, Sb, Te or Bi and may have additives of Ag, Cu, Ge, In, Si, ZnS, nitrides, oxides, phosphides or sulfides included (6/59-7/35) and a thickness of preferably 5-50 nm (8/46-54). The first recording layer. The first recording layer can include various metals including Cu, Si, Ge, Sn, In, Pb, Zn and can have additives such as MoS<sub>2</sub>, MgF<sub>2</sub>, NiS, NiS<sub>2</sub>, Cu<sub>2</sub>S, ZnS, In<sub>2</sub>O<sub>3</sub>, In<sub>2</sub>S<sub>3</sub>, GeS, GeS<sub>2</sub>, SnS, SnS<sub>2</sub>, PbS, Bi<sub>2</sub>S<sub>3</sub>, MoO, InO, GeO, PbO, SiO, SiO<sub>2</sub>, SiC, TiC and others. The thickness of the first recording layer can be 5-50 nm (8/30-40).

Takahashi et al. '706 teach useful metals for the heat mode recording layer including In, As, Sb, Bi, Se, Te, Mg, Al and Ti. (3/52-58). Additives including various oxide, fluoride and sulfides, including PbO, WO<sub>3</sub>, TiO<sub>2</sub>, SiO, SiO<sub>2</sub>, ZrO<sub>2</sub>, GeS, GeS<sub>2</sub>, MoS<sub>2</sub>, NiS, MoO, InO, In<sub>2</sub>O, GeO, and sulfides, selenides or tellurides of Ge, In, Sn, Cu, Ag, Fe, Bi, Al, Si, Zn, and V, can be added to increase the sensitivity either as a separate layer or being mixed with the metal. (4/1-33). The thickness when the recording layer is a single layer, rather than a laminate is 5-2000 nm. (3/59-63).

JP 54-133134 teaches alternative layers of Indium oxide (5 nm) and Manganese oxide (2 nm) until a thickness of 540 nm is achieved. This is written upon using a 488 nm argon ion laser (upper left and right columns and lower left column on page 5). Example 3 discusses the dispersion of the components in a single layer as shown in figure 2, rather than the alternating layer embodiments illustrated in figures 1,3 and 4.

It would have been obvious to one skilled in the art to modify example 21 of Suzuki et al. '752 by adding other known dielectric materials including TiC or the like to the second recording

composition and forming a composite layer, rather than a bilayer as taught by Takahashi et al. '706 and JP 54-133134 and providing a protective layer and adhering the recording media together as shown in figure 4 to double the recording capacity, where the second substrate is the light transmission layer. This results in a recording medium with two recording layers having thicknesses of 5-50 nm (This allows the interpretation of the Ti as a chemical compound with carbon (C)) and/or it would have been obvious to modify the example of Takahashi et al. '706 by replacing the GeS with  $\text{TiO}_2$  or  $\text{Al}_2\text{S}_3$  based upon the disclosure at (4/6-19) and adhering the recording media together through the protective layers as shown in figure 4 of Suzuki et al. '752 to double the recording capacity noting the use of bilayers or composite layers in both Takahashi et al. '706 and JP 54-133134 (This allows the interpretation of the Ti as a chemical compound with oxygen (O) or Al with sulfur (S)).

In response to the arguments, the examiner notes that the claims rejected under this heading are silent with respect to the composition of the furthest recording layer. The claims merely are describing the composition of the other recording layer(s). Aside from the 112 issues addressed above, the examiner notes that the use of Bi/In and TiC is reasonably taught in Suzuki et al. '752 and that the combination of In, As, Sb, Bi, Se, Te, Mg, Al or Ti with  $\text{PbO}$ ,  $\text{WO}_3$ ,  $\text{TiO}_2$ ,  $\text{SiO}$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{GeS}$ ,  $\text{GeS}_2$ ,  $\text{MoS}_2$ ,  $\text{NiS}$ ,  $\text{MoO}$ ,  $\text{InO}$ ,  $\text{In}_2\text{O}$ ,  $\text{GeO}$ , and sulfides, selenides or tellurides of Ge, In, Sn, Cu, Bi, Al, Si, or Zn in forming a recording layer is taught by Takahashi et al. '706, which renders obvious combination including of In or Bi with  $\text{TiO}_2$  or sulfides of Al, or the case of Mg, Al or Ti with  $\text{PbO}$ ,  $\text{WO}_3$ ,  $\text{SiO}$ ,  $\text{SiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{GeS}$ ,  $\text{GeS}_2$ ,  $\text{MoS}_2$ ,  $\text{NiS}$ ,  $\text{MoO}$ ,  $\text{InO}$ ,  $\text{In}_2\text{O}$ ,  $\text{GeO}$ , or sulfides of Ge, In, Sn, Cu, Bi, Si, or Zn. The teachings of Takahashi et al. '706 and

JP 54-133134 address the issue of the equivalence of the bilayer and composite layer embodiments. The reflectance issue raised by the applicant would have to specify the relative amounts of the materials to be commensurate in scope with the argued position. The examiner notes that there seems to be a 112 issue of enablement with the argued position as discussed above and when the composite layer is used, there are two different metals, with one being reacted with C,O,N, or S to proved the change in particle size of the metal which is not part of a compound. The examine does note the data in the specification at pages 52, 84,90 and 98 of the instant specification, but notes the composition are outside of the scope of coverage sought and therefore are not able to support the position of unobviousness. The rejection stands as modified.

**D** Claims 17-27 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '752 and Takahashi et al. '706, in view of JP 54-133134, further in view of (Takaoka et al. '321 or Mizushima et al. JP 2003-054135) combined with Nee '334 and Nishida et al. '881.

Takaoka et al. '321 teach optical recording media with multiple bilayer recording composites which are separated by intermediate layers. (see figure 10)

Mizushima et al. JP 2003-054135 (machine translation attached) teaches with respect to figure 7 a recording medium having plural recording bilayers separated by an intervening layer (TL). DL-1 had layers 4 and 6 nm thick and DL-2 had layers 3 and 5 nm thick. [0103-0113]. DL-2 is closer to the laser light incident side.

Nee '334 teaches optical recording media where the there are three recording layers with respect to figure 4. The reflectivity of the layers is different with the further layers being more

reflective while the nearer layers are partially transmissive to allow accessing of all of the recording layers [0046].

Nishida et al. '881 teach multilayered recording media with four recording layers on each of the substrates with respect to figure 3 (12/65-13-/52). The multilayered recording media are not limited to read only media, but may include writable recording layers (15-17, fourth embodiment and 29/30-51).

To address embodiments bounded by the claims, but not rendered obvious above, the examiner holds that it would have been obvious to one skilled in the art to modify the media rendered obvious by the combination of Suzuki et al. '752, Takahashi et al. '706 and JP 54-133134 by adding more recording layers (ie a third or fourth) as taught by Nee '334 and Nishida et al. '881 to increase the information density of the medium as a whole with a reasonable expectation of success based upon the known use of recording media in the art which have plural recording bilayer recording layers as evidenced by Takaoka et al. '321 or Mizushima et al. JP 2003-054135. Further it would have been obvious to vary the thicknesses of the recording layers and to use other recording layers as the furthest recording layer/bilayer based upon the teachings of these in multiple recording layers systems by Takaoka et al. '321 or Mizushima et al. JP 2003-054135.

To address the applicant's argument relating to the absence of plural recording bilayers in Suzuki et al. '752 and Takahashi et al. '706, in view of JP 54-133134 on page 20 of the response, the examiner points to Takaoka et al. '321 or Mizushima et al. JP 2003-054135 as well as the double sided recording medium of Suzuki et al. '752 which establish that it is known in the art to have alloying type recording media with plural recording bilayers. There is no issue of

functionality as long as these are separated by more than the depth of field of the focused laser beam. Were the claims to require that all the recording layers be accessed from the same side and the laser operating in the UV (this layer will contain a UV absorber to make it UV curable), the presence of the adhesive layer in Suzuki et al. '752 might be an issue, but currently the claims do not include these limitations and clearly both substrates are transparent. Meeting the substrate and light transmission layer limitations. The response to the arguments concerning Nee '334 and Nishida et al. '881 is similar, the laser used by the applicant and in the references are in the visible and the claims do not require that all the recording layers be accessible from the same side. The applicant's arguments are further undercut by the fact that the instant application uses a UV curable layer as a protective layer as discussed at [0196] of the prepub of the instant application, which is similar in composition to a UV curable adhesive or other UV curable layers disclosed by the references.

The rejection stands as modified for the reasons above without further comment as no further arguments were presented.

E Claims 17-27,29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. '752 and Takahashi et al. '706, in view of JP 54-133134, further in view of (Takaoka et al. '321 or Mizushima et al. JP 2003-054135) combined with Nee '334 and Nishida et al. '881 combined with Shuy et al. '160.

Shuy et al. '160 teaches a transparent layer of Ge, Si, GaP, InP, GaAs, InAs, ZnSb, TiO<sub>2</sub>, Sb-Zn oxide as a transparent layer (30) in a thickness of 5-500 nm and reflective layer (40) may be Ag, Al, Au, Pt, Cu, Sn, Ir, Ta and alloys and/or combinations thereof in a thickness of 1-500

nm. [0026-0027]. The examples use silicon and gold as the materials. In figure 1A, the provision of thermal manipulation layers (dielectric layers) is disclosed and the use of protective layers is disclosed. (60). Shuy et al. '160 further teaches in embodiment 4 that a substrate (10) with a layering sequence of  $\text{ZnS-SiO}_2/\text{Si}/(\text{Si-Au})/(\text{ZnS-SiO}_2)_2$  is formed. The recording uses 1-5 V pulses at 780 nm. The examples use 2 or 3V.

In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the media resulting from the combination of Suzuki et al. '752 and Takahashi et al. '706, in view of JP 54-133134 and either of (Takaoka et al. '321 or Mizushima et al. JP 2003-054135) with Nee '334 and Nishida et al. '881 by using other alloying recording layers, such as the Ge/Si layers taught by Shuy et al. '160 for the furthest recording layer with a reasonable expectation of forming a useful optical recording medium based upon both Takaoka et al. '321, Mizushima et al. JP 2003-054135 and Shuy et al. '160 using alloying bilayers as the recording layers.

On pages 17-18 of the response, the applicant asserts that the alloying/mixing of the bilayers of Shuy et al. is different from that of Suzuki et al. '752, Takaoka et al. '321, Mizushima et al. JP 2003-054135, Takahashi et al. '706 and JP 54-133134. This position is without merit as the mechanism in all these references involves mixing of the different components and all the references specifically disclose bilayer recording media, where the laser heats these and cause mixing/alloying of the different components. They are in fact analogous.

The rejection stands as modified for the reasons above without further comment as no further arguments were presented.

**(10) Response to Argument**

The applicant argues that the medium of Suzuki et al. is a double sided medium with each recording layer accessed from a different side (through the transmissive layers/substrates) and argues that these are not constituted so that a laser may be projected onto both of them via a single light transmissive layer/substrate (brief at page 7) . The position of the examiner is that while Suzuki et al. may use these media by accessing the recording layers from both sides, the disclosure includes embodiments where the recording layers forming the recording bilayer are thin (10-20 nm) and the layers between the two recording bilayers are not light absorbing. Layer 8 is an adhesive layer which might absorb in the UV, but not at the recording layer wavelength. The protective layers in the cited examples are UV cured and similarly would be transparent to the near-IR/ Red laser wavelength. The position of the examiner is that the media rendered obvious as discussed above would allow light to reach the further recording layer when exposed through either of the substrates, which are transparent and act as the transparent layer of the claims when light is shown through them.

The applicant argues that neither Takahashi et al. or Yoshiyuki et al. teaches a plurality of recording layers (brief at page 7). The examiner agrees, noting that they are not relied upon for this teaching.

The applicant argues that none of the references teach the shallow recording layer(s). The examiner assumes that this refers to a nearer recording layer as opposed to the

further/furthest referred to in the claim (brief at page 7). The position of the examiner continues to be that as Suzuki et al. teaches media with two recording layers for light incident from one side, one of the recording layers is inherently further from the incident light and the other inherently nearer/shallower.

The applicant argues that the three references applied function in different modes and that therefore the references are not combinable to one of ordinary skill in the art. (brief at page 8). The examiner holds these references to be combinable as they are all within field of the optical recording media at where the reaction/mixing of a bilayer results in recorded information. The examiner also points to the overlap in the materials taught in the references. Suzuki et al. at 6/17-37 & 6/59-7/22, Takahashi et al. at 3/52-4/33 and Yoshiyuki et al. in the examples and on page 4. The teachings of Takahashi et al. and Yoshiyuki et al. serve to establish the equivalence of the use of recording bilayers and a single, mixed recording layer in which different materials react/alloy/mix to form a recorded area under the influence of laser light in the optical recording arts.

The applicant repeats the arguments with respect to the combination of Suzuki et al, Takahashi et al. and Yoshiyuki et al. and does not advance any additional arguments with respect to the Takaoka et al., Mizushima Nec and Nishida references. (Brief at page 9). The examiner points out that the multiple recording layer media of figures 9 and 10 of Takaoka et al. do not include any layers which would block the light from passing reaching the further recording layer

and that the media of figure 7 of Mizushima et al. JP 2003-054135 illustrates the recording layers DL-1 and DL-2 as both being accessed from the same side (topside).

The applicant does not advance any additional arguments with respect to the Shuy reference. (Brief at page 10). The examiner has no further comment.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Martin J Angebranndt/

Primary Examiner, Art Unit 1795

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